



## 1. Subject

---

**“Use and Implementation of BIM 3D, 4D, 5D & 6D Digital Modelling Technologies in Architectural Design During Construction and Operation of Structures”. (teaching on Bachelor Level, 2 ECTS)**

## 2. Goals of the Course

---

The aim of the course is to endow the future Armenian architects with such sustainable and fundamental knowledge which would enable them to cooperate with the specialists of other building industry branches to the best advantage, such as constructors, specialists of electromechanics, infrastructure engineers and others in steadily changing conditions of construction market, with BIM technologies from the very beginning stage of design up to the construction end and **exploitation/operation**.

Mastering these technologies, they will acquire skills so as to contribute to the following important factors:

- Improving of the design process quality and efficiency, quick and harmonious application of design changes as a result of collaboration with engineers of different professions
- Improving the quality and efficiency of the construction process itself, optimization of workflows
- Notable reduction of construction duration and cost price
- Preliminary removal of design errors (clash detection)

The students will acquire such sustainable and state-of-the-art skills that will enable them to become required, wanted and competitive specialists not only in the Armenian but also gradually narrowing international work markets.

## 3. Expected Study Outcomes

---

Communication with students proves that the vast majority of them excellently understand the urgency of BIM technology teaching.

We have no other way out except immediately get down to **business/work/** and spare no efforts and **means / resources/** to gradually reduce the gap between foreign universities.



There is no other way.

#### 4. Necessary Basic/Fundamental/ Knowledge

---

Autodesk Inc. Company's Architecture, Engineering & Construction Collection, Inventor, Navisworks, Dynamo, BIM 360 packages as astounding development tools in the fields of architecture and construction (as well as in the fields of industry, mechanical engineering, etc) are considered leading in the world practice. Therefore, it's high time that the Armenian students were included in this inevitable process, acquaint them with the whole **armoury / arsenal** of advanced BIM technologies so that to be competitive and **wanted/ required** when entering a professional life.

As a matter of fact, the cornerstone of BIM chain for the collaboration of construction industry various wings is Autodesk Revit which has recently become a universally accepted standard, even a mandatory format thanks to its smooth, easy-to-understand workflow for the designers, supervising organizations, contractors, clients, city authorities of a number of advanced countries.

As a starting point, it is necessary to master this package excellently, which has become a universal standard.

#### 5. Teaching Methods

---

In a lecture hall equipped with personal computers (PC), downloaded BIM software packages and a projector, experienced teachers with their personal example will slowly but steadily and simultaneously thoroughly build the foundation and superstructure of the future architects' BIM literacy.

Understanding levels are different but it's necessary to follow each student's advancement personally but not to just give knowledge and skills and go ahead.

We have already had success in the above mentioned theory and laboratory experience by the example of a series of fundamental classes with 7 students lately held in Room 2224 thanks to the practical and grateful collaboration of the NUACA Vice-rector and Architecture Department Dean.

In COVID pandemic conditions as well as from the point of view of efficiency, it's possible to hold the theoretical and practical classes in closed classrooms, with the participation of 7-8 masked students at the most, whereas seminars and on-line webinars are to be held creating appropriate conditions.



## 6. Assessment / Evaluation Methods

---

The evaluation / assessment methods for BIM courses will be refined in due course taking into consideration the number of students involved, individual progress, complexity degree of the experimental projects.

## 7. Required References

---

1. *"BIM Teaching and Learning Handbook – Implementation for Students and Educators"* (M. Reza Hosseini, Farzad Khosrowshahi, Ajibade Aibinu, Sepehr Abrishami) ISBN 9780367427955.
2. *"BIM Handbook: A Guide to Building Information Modelling for Owners, Designers, Engineers, Contractors and Facility Managers"* (John Wiley and Sons, by Raphael Sacks) ISBN-10: 9780470541371.
3. *"BIM and Beyond: Digital Transformation in the Built Environment - A BSI White Paper for Business"* (PDF version – [www.bsigroup.com](http://www.bsigroup.com) ).
4. *"BIM Design – Realizing the Creative Potential of Building Information Modeling"* (John Wiley and Sons, by Richard Garber).
5. *"Mastering Autodesk Revit 2020"* (Sybex, by Robert Yori, Marcus and Lance Kirby).
6. *"BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors"* (John Wiley and Sons, by Chuck M. Eastman, Paul Teicholz, Raphael sacks and Kathleen Liston).
7. *"Implementing Successful Building Information Modeling"* (by Erika Epstein).
8. *"The BIM Manager's Handbook: Guidance for Professionals in Architecture, Engineering and Construction"* (by Dominik Holzer).
9. *"BIM and Construction Management: Proven Tools, Methods and Workflows"* (by Brad Hardin and Dave McCool).
10. *"BIM Design: Realizing the Creative Potential of Building Information Modelling"* (by Richard Garber).
11. *"A Practical Guide to Adopting BIM in Construction Projects"* (by Bilal Kumar).
12. *"Beyond BIM: Architecture Information Modeling"* (by Daniel Briscoe).
13. *"The Construction Manager's BIM Handbook"* (by John Eynon).
14. *"Understanding BIM: The Past, Present and Future"* (by Jonathan Ingram).
15. *"BIM and Quantity Surveying"* (by Steve Pittard).